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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/053,679	01/21/2002	Robert J. Smith	1604-381	8432
22442	7590	03/08/2006	EXAMINER	
SHERIDAN ROSS PC 1560 BROADWAY SUITE 1200 DENVER, CO 80202			BELLO, AGUSTIN	
			ART UNIT	PAPER NUMBER
			2633	

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/053,679

Applicant(s)

SMITH, ROBERT J.

Examiner

Agustin Bello

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24, 26-58, 60-74 and 76-89 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24, 26-58, 60-74 and 76-89 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/9/06 has been entered.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1-24, 26-58, 60-74, and 76-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood (U.S. Patent No. 5,757,523) in view of Schwemmer (U.S. Patent No. 5,255,065).

Regarding claims 1, 11, 24, 35, 36, 47, 48, 57, 68, and 77-89, Wood teaches passing an one or more optical signals (reference numeral 29a-c in Figure 7), the one or more optical signals containing data and being composed of radiation of a plurality of differing wavelengths (e.g. WDM in column 5 lines 60-63), through a diffractive optical element (reference numeral 14 in Figure 7) to form a plurality of signal segments (reference numeral 29a-c in Figure 7), each signal segment having a different mean wavelength (column 5 lines 54-57); passing a portion of each of said one or more optical signals through a phase retarder (column 4 lines 9-19), and

Art Unit: 2633

detecting data in each of said plurality of signal segments at a different spatial location (locations represented by reference numeral 29a-c in Figure 7). Wood differs from the claimed invention in that Wood fails to specifically teach the plurality of spaced apart detectors are located substantially at a different focal point, the focal points being at different positions along a common optical axis. However, Schwemmer teaches this concept (see Figure 4). One skilled in the art would have been motivated to employ a detection apparatus such as that taught by Schwemmer in conjunction with the device of Wood in order to separate different wavelengths along a common optical axis (column 4 lines 1-5 of Schwemmer). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a reception apparatus such as that taught by Schwemmer in conjunction with the device of Wood.

Regarding claims 2 and 49, Wood teaches transmitting each of said optical signals through atmospheric distortion (e.g. air) but differs from the claimed invention in that Wood fails to specifically teach that the data rate is greater than one gigabit/second for each wavelength. However, data rates of greater than 1 Gbps over free-space are well known in the art and would have been achievable with the system of Wood.

Regarding claims 3 and 21, Wood teaches that the diffractive element is a hologram (column 3 lines 57-63).

Regarding claims 4, 15-17, 50-51, and 69-71, Wood teaches that said phase retarder has an area that is less than an area of said diffractive optical element (e.g. the actual phase retarding portion is represented by the dark areas 22 in Figure 2, which have an area less than the area of the diffractive element), a first portion of the optical signal is passed through a phase retarder (column 4 lines 45-50) wherein said phase retarder is located in at least a central portion of the

Art Unit: 2633

diffractive optical element (reference numeral 12 in Figure 1; e.g. the phase retarding portions are scattered throughout the element engaging the diffractive optical element and is located in least a central portion of the diffractive element), wherein the first portion of the optical signal has a different phase than a second portion of the optical signal that is not passed through the phase retarder (inherent in the use of a phase retarder) and wherein said first portion is the radiation in the optical signal that contacts the diffractive optical element within a radial distance of a center of the diffractive optical element while said second portion is the radiation that contacts the diffractive optical element outside the radial distance (as seen in Figure 2a).

Regarding claims 5, 52, 59, and 72, Wood teaches that in the detecting step, each of the plurality of signal segments is detected by a different detector (inherent in that each of the signals 29 falls on a different detector in Figure 7 when applied to the scenario in Figure 4).

Regarding claims 6, 7, 18, 19, 26, 38, 53, 58, 61, 73, and 74, Wood teaches that in the detecting step, the mean wavelength of at least one of the signal segments is reduced before the at least one of the signal segments contacts a detector and the spot size of the signal segment is reduced by a lens (via reference numeral 16 in Figure 1a).

Regarding claims 8, 20, and 54, Wood inherently teaches that, the plurality of signals are reflected by a reflective surface (inherent in the free-space nature of the signals, e.g. reflecting off of any surface between the transmitter and the receiver) after the dividing step and before the detecting step.

Regarding claims 9-10, 22-23, 55-56, and 76, Wood differs from the claimed invention in that Wood fails to specifically teach that the optical signal has a beam size at an aperture of a source transmitter associated with the optical signal that is less than an atmospheric inner scale

Art Unit: 2633

and that the beam size at the transmitter is no more than about 10 mm. However, one skilled in the art would clearly have recognized that it would have been possible to scale the beam size to any convenient size including less than 10 mm. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to scale the beam size to a size less than 10 mm.

Regarding claim 12, Wood teaches that each of the detectors is located in an end-to-end configuration relative to the adjacent detector (see Figure 4 with the houses being the detectors and Figure 7 with the patterns directed to adjacent detectors).

Regarding claims 13, 14, 29, 30, 33, 37, 41, 42, 60, 63, and 64, Wood teaches that the longitudinal axes of each of the detectors are at least substantially parallel to each other and collinear (see Figure 4 and 7).

Regarding claims 27 and 39, Wood teaches a reflective surface positioned on a first side of the at least one diffractive optical element (column 5 lines 17-25).

Regarding claims 28, 40, and 62, Wood teaches at least some of the plurality of detectors are located in a hole (reference numeral 30a in Figure 2a) in the at least one diffractive optical element.

Regarding claims 31, 43, and 65, Wood teaches that at least one diffractive optical element has an obscuration (as seen in Figure 2a) and at least one of the plurality of detectors is located in a shadow of the obscuration with respect to radiation having a wavelength different from a wavelength of radiation converging on the at least one detector (inherent in the overlap of signals at the far-field).

Art Unit: 2633

Regarding claims 26, 32, 44, and 66, Wood teaches that that least one of the detectors is integral with the corresponding immersion lens (Figure 1a).

Regarding claim 34, Wood differs from the claimed invention in that Wood fails to specifically teach that an aperture size of the holographic unit exceeds the Fresnel scale. However, one skilled in the art would clearly have recognized the ability to scale the aperture size of the holographic unit to any required size including a size exceeding the Fresnel scale. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to scale an aperture size of the holographic unit so that it exceeds the Fresnel scale.

Regarding claims 45, 46, and 47, Wood differs from the claimed invention in that Wood fails to specifically teach the dimensions of the first and second lens. However, such limitations are a matter of design choice and could have been duplicated by one skilled in the art at the time the invention was made. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to select the dimension claimed.

Regarding claim 67, Wood differs from the claimed invention in that Wood fails to specifically teach that the first lens has a focal length and the reflective surface is located at a distance from the first lens that is approximately equal to 50% of the focal length. However, one skilled in the art would clearly have recognized the ability to establish the focal lengths of the lenses at any of a variety of positions including those that result in the claimed distances. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to establish the length claimed.

***Response to Arguments***


4. Applicant's arguments filed 1/9/06 have been fully considered but they are not persuasive. The applicant has made various amendments to the claims that introduce new limitations to the claimed invention. However, the examiner maintains that the cited references continue to meet the limitations. For example, Wood clearly teaches the phase retarder (Figure 2), the immersion lenses (Figure 1a), and inherently teaches the newly added limitations of claim 24. Wood differs from the claimed invention in that Wood fails to specifically teach the dimensions of the lenses (claim 47) and the transmitted beam. However, the examiner has taken the position that such limitations would have been a matter of design choice.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**AGUSTIN BELLO**  
**PRIMARY EXAMINER**